

Palmer (A. B.)

LECTURES

ON

SULPHATE OF QUINIA:

DELIVERED IN THE REGULAR COURSE OF THE MEDICAL DEPARTMENT
OF THE UNIVERSITY OF MICHIGAN,

BY

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PREFACE.

As more copies of the following Lectures will be printed than will be required by the gentlemen of the Medical Class who publish them, the Author wishes to say a few words to others of the Profession whom they may reach.

Although the views contained in these Lectures have been well considered and are deliberately entertained—are, indeed, the result of much observation, experience, and reflection,—yet the language in which they are here presented has been most hastily prepared. The manuscript notes from which the Lectures were delivered contained only the outlines and some of the leading thoughts, sketched in an abbreviated form—the full expression of the ideas, and the methods of their illustration and enforcement, having been left for the occasion of their presentation; and in writing them out for the press, so as to have them ready for distribution before the approaching dispersion of the members of the Class who desire them, very little time has been afforded—and, as the manuscript was sent to the printers as fast as written, there has been no opportunity for revision, except such as may be presented in reading

the proof. Should defects in style or arrangement be observed, it is hoped these circumstances will be taken into the account in modifying the severity of criticism.

One thing more. These Lectures are not presented as a complete Treatise on Quinine;—they are offered simply as a few Lectures on a single article, taken from a Course on *Materia Medica* and *Therapeutics*, necessarily restricted within certain limits, and presenting views on the subject regarded as most important to be understood. Lectures to Students, in order to arrest their attention and impress the opinions of the teacher upon their minds, must be, to some extent, dogmatic in manner, and they do not admit of that full citation of authorities, and that elaborate presentation of all the facts and processes of reasoning upon which conclusions are based, as should be afforded in an extended Treatise.

With these explanations, this humble contribution to Therapeutical Science is now offered to Students and the Profession.

Correspondence.

UNIVERSITY OF MICHIGAN,

ANN ARBOR, December 5th, 1857.

Prof. PALMER:

Respected Sir,—The members of the Class of the Medical Department of the University of Michigan, being much interested in and highly pleased with your practical Lectures upon Quinine, just delivered, have appointed the undersigned a Committee to request said Lectures for publication.

Believing as we do that their publication would supply needed literature upon this important article of the *Materia Medica*, and be most beneficial to ourselves, we hope you will not refuse our request.

We are, very truly, yours, &c.

H. M. DARLING.

THOMAS LOTHROP, JR.

J. J. COMFORT.

UNIVERSITY OF MICHIGAN,

ANN ARBOR, January 18th, 1858.

Prof. A. B. PALMER:

Dear Sir,—At a meeting recently held by the students of the Medical Class of the University of Michigan, for the purpose of renewing efforts to secure the publication of your Lectures on Quinine, W. E. THOMPSON, of Indiana, was called to the Chair; when, on motion, it was unanimously

Resolved, That whereas we deem the Lectures of Professor A. B. PALMER on Quinine superior, in a practical point of view, and especially so to those who expect to encounter diseases in the West, to any articles on the subject which are found in the Standard Works, a Committee be appointed, consisting of the undersigned, to again solicit a copy of said Lectures for publication, and, if the request be granted, to make arrangements for the same.

Trusting that you will see fit to comply with the wishes of the Class, as expressed in the resolution,

We remain yours, with respect,

JONA. J. COMFORT,

E. M. WINSLOW,

M. L. GREENE,

Committee.

UNIVERSITY OF MICHIGAN,

ANN ARBOR, January 27th, 1858.

Messrs. J. J. COMFORT, E. M. WINSLOW,

and M. L. GREENE:

Gentlemen,—Your note of the 18th instant, asking, in behalf of the Medical Class, for a copy of my Lectures on Quinine for publication, was duly received, as well as one from a previous Committee of the same body on the same subject.

Having had personal interviews with the first Committee, I did not in writing answer their communication; and thinking, after the lapse of some time, the Class might not regard the publication of the Lectures of as much consequence as they still seem to do, I have deferred until the present a definite reply to the requests.

For the purpose of gratifying the repeatedly-expressed wishes of the members of the Class, rather than my own, I have concluded to prepare and place at your disposal a copy of the Lectures. In presenting them in a form separate from the Course of which they constitute a part, some modifications of arrangement will be necessary, to give any thing like unity and completeness to the subject; but, while this is done, the same thoughts and expressions will be preserved, and as much as is consistent of the original order.

While I am highly gratified with the manner in which the Lectures were received, I fear that, when reduced to writing and presented in print, they will fail to sustain the impression their delivery produced. In the clearness and impressiveness of all oral communications, so much depends upon associations, manner, emphasis, repetitions and illustrations—upon circumstances and qualities which can not be expressed by types,—that often what appears as somewhat novel and striking when heard, is found to be more tame and commonplace when read. But, notwithstanding this, I present these Lectures, through you, to the members of the Class, and hope, as they contain practical opinions, which are the result of much observation and experience in the application of a most important remedy to the prevailing diseases of the West, they will be a useful guide to yourselves, as young Practitioners, and will be found to corroborate the more enlightened views of the observing and thinking members of the Profession, if they do not establish much that is positively new.

With the most grateful emotions to the Medical Class for the uniform kindness and attention they have shown me, and for the flattering manner in which, through their Committees, they have expressed their appreciations and feelings,

I am, very truly, their and your obedient servant,

A. B. PALMER.

SULPHATE OF QUINIA.

LECTURE I.

GENTLEMEN:

We come now to consider the most important ingredient in that highly complex substance, Cinchona, or Peruvian Bark, viz., *Quinia*, or, as it is commonly combined and called as used in Medicine, the *Sulphate of Quinine*.

Although the Peruvian Bark has been used among Europeans for over two hundred years, it is scarcely half a century since it was analyzed, and its alkaloids were discovered, separated, and examined by themselves. The French chemist PELLE-TIER has the honor of the discovery of Quinia, and MAGENDIA first experimented with it upon animals, and ascertained some of its relations to the vital organism; and it having been ascertained by these means to be not actively poisonous, and the inference having been drawn that it possessed the virtues of the Bark, it was soon introduced into Medicine, and for the last thirty or forty years has been a leading article of the *Materia Medica*.

The great prevalence in this country, and particularly in the West, of the diseases to which it is more especially applicable, and in which it is so peculiarly efficacious, caused its introduction here to be hailed with great joy. The late Dr. HARRISON, of Ohio, depicts in glowing terms the joyful manner of its reception in his locality; and, although prejudices have arisen

which it has had to encounter, it has steadily increased in favor as it has become better known, and not a year passes which does not add to the sphere of its application in disease and its reputation with the Profession. The importance of this article is such—its power of counteracting disease, when properly applied, is so great—that you will do well to give special attention to what may be said respecting it.

The mode of preparing the Sulphate of Quinine from the Bark, you will receive from the Chair of Pharmacy, and may also find, at any time, in the books. Under the proper manipulations and actions of reagents, the Yellow Bark yields from one and a half to three per cent. of the salt. It occurs in very fine, needle-like, silky, flexible crystals, of a perfectly white color, as you see, and which are inodorous and have a very bitter taste. Exposed to air, these crystals effloresce slightly; by being mechanically pressed, as by carrying about one's person, they are easily broken down, and occupy a smaller space; by a moderate heat they are fused, and by red heat are decomposed.

This article requires for its solution 740 parts of cold, but only 30 of boiling water, and it gives a blue tinge to the water. It is soluble in about 60 parts of alcohol, and is very soluble in dilute sulphuric, or almost any of the other acids. A few drops of elixir vitriol, or a few grains of tartaric acid, added to a drachm of Sulphate Quinine, will render it soluble in a small quantity of water.

Its chemical composition, as given by Prof. Wood, is, one equivalent of sulphuric acid, 40, one of quinine, 324, and eight equivalents of water, $72 = 436$.

The physiological actions of all medicines should be studied with care, as a knowledge of the impression they make upon the organism in its normal condition is essential to a full philosophical understanding of their therapeutical effects—of the manner of their operation in disease. Though we may learn empirically, from simple observations upon the sick, that a certain powerful medicine usually controls particular morbid processes, we are but illy prepared to prescribe safely such article

in the varying conditions of the system attendant upon any disease, unless we know the particular action of that article upon the system in health—the specific effects which it tends to produce upon all the different organs of the body. Your attention, therefore, will be, first, though briefly, called to a consideration of the best ascertained physiological effects of this article.

The first experiments made with Quinine upon the lower animals, seemed to indicate that it was quite harmless in its action; later observations, however, have shown that in certain large doses it proves fatal to animals. MELIER found that it could be made to produce stupor, staggering, or sudden falling down, dilatation of the pupil, coma, varied conditions of the pulse, convulsions, and death. The *post-mortem* appearances were, congestion of the lungs, and deficient coagulability of the blood. We may observe some analogy between this congestion of the lungs in the poisoned animals and the sense of stricture in the chest which is sometimes, though not very frequently, experienced in the human subject when under the influence of Quinine.

Given to man, it occasions a pure, though intensely bitter and somewhat persistent taste, and in small doses it usually promotes the appetite and assists digestion. It seems to possess the properties of other simple bitters, and, in moderate doses, doubtless acts as a *tonic*. By a tonic, you understand a medicine which does not so immediately call forth action like stimulants, or depress it like sedatives, but one which gives power to the system to generate nervous force, by which the whole body is strengthened. Quinine then, used in this manner, is a tonic, giving strength—not merely a stimulant, calling it forth. It does not merely excite action, as action is not strength—over-action having the effect to increase exhaustion—but it gives, like all true tonics, the power to act. This effect may depend, to a great extent, upon its improvement of the appetite and increased digestion, or possibly upon some more direct restorative effect upon the blood; but, in some degree at least, the tonic action is accomplished by its direct impression upon the general

nervous and muscular systems. This tonic action is realized when Quinine is given in doses of one grain three times a day.

In large doses, as from five to twenty or more grains, Quinine produces other effects—effects which in their results are different in *kind*, as well as in *degree*, from those produced by small doses. In these larger doses, it is capable of a somewhat mixed and peculiar, though in many respects a *decided sedative*, operation. This sedative action of Quinine is constantly witnessed by those who are in the habit of administering it in large doses in disease, and has been further substantiated by some experiments of BRIQUET upon dogs, in which he found that when from seven to thirty grains were, in solution, injected into the external jugular veins of these animals, the force of the heart's contractions was diminished in proportion to the quantity used—seven grains having but little effect, while thirty grains caused speedy death by syncope—the heart ceasing to act altogether. It should be mentioned that in other experiments, where similar solutions were made to enter directly the cerebral vessels, the brain was excited, and the force of the heart's pulsations was somewhat increased. These facts taken together show, what we shall have occasion to refer to again when speaking of the therapeutical application of this article, that it may operate either as an exciting or a depressing agent, depending upon the condition of the system, the dose given, and the particular organs on which it acts; that in the same case it may depress some functions, while it sustains others.

Quinine has sometimes produced *Gastro-Enteric Irritation*, marked by pain and heat in the gastric region, nausea, griping, and purging.

Constipation has sometimes been thought to have been produced; and a kind of *Salivation* also, but with firm teeth and inodorous breath—but these latter results are so rare, if they exist at all as the effects of this article, that they are not to be taken into the account in prescribing it. I have seen no other salivation induced than that which arose from the bitter taste of the medicine left in the mouth.

Irritation of the Gastric Membrane, without the accompanying intestinal irritation, not very unfrequently occurs, or, rather, is sometimes aggravated where it already exists, on the administration of Quinine; and these effects, according to my experience, are about as likely to occur from three or four grain doses, as from doses of eight, ten, or more, grains. But these irritating effects upon this surface can almost always be prevented by combining Morphine with the Quinine.

Excitement of the Vascular System, manifested by increase of frequency and fullness of the pulse, augmented respiration, heat of the surface,* furred tongue, and other symptoms of a febrile state, are sometimes, or in certain conditions of the system, produced by Quinine, when given in doses of from two to four or six or more grains, repeated every second or third hour, or a grain or two once an hour. If a paroxysm of fever be present, or an inflammatory irritation, or a fullness of the system, and especially when no miasmatic influence is operating as an exciting cause of these states, these effects of excitement are more likely to occur. In the intermission of a miasmatic fever, however, even when there is considerable local irritation, such effects are seldom produced, especially if the Quinine be combined with Morphine and relaxing diaphoretics.

Disorders of the Cerebro-Spinal Functions are not unfrequently produced by Quinine, indicated by headache, giddiness, contraction, or, sometimes, dilatation of the pupil, ringing or roaring in the ears, deafness, partial blindness, abnormal touch and smell, difficulty of controlling muscular acts, somnolency, sometimes delirium, at other times stupor. As already intimated, a severe sense of stricture about the chest is sometimes experienced. These effects are, for the most part, temporary, and pass off like a fit of intoxication, but in some rare instances they are more permanent. Such effects are sometimes called *Quininism*.

A fatal case is reported to have occurred in the Hotel Dieu, Paris, where a patient with rheumatism, who had taken one hundred grains in the course of a day and a half, in divided

doses, was suddenly seized with violent agitation, followed by furious delirium, and death in a few hours.

Another fatal case is recorded, where a medical practitioner in France, imagining himself about to be attacked with pernicious intermittent fever, took nearly two ounces Troy, which produced much prostration. Attributing this prostration to the fever, he continued the medicine, taking in the course of nine or ten days five additional ounces. He was then found by another physician, covered with cold sweat, completely deaf and blind, in a profound stupor, with a drunken expression of countenance, and difficult and rattling respiration. Though partially aroused with much difficulty, he quickly became delirious, and died.

In another case, where ten drachms and a half were taken in the course of a few days, the patient lost, for a time, sight, hearing, and speech, and became cold as a corpse, but recovered. Dangerous consequences have been reported by others; but, in a large experience with the article, of nearly twenty years, I have never seen any dangerous effects, though I have never given it in such enormous doses. Enormous doses, as of an ounce or more in a few hours, have been given, however, apparently without injury. In many of these cases, doubtless, only a part of the medicine was absorbed, yet very large quantities may be taken into the circulation without serious consequences.

In consequence of some of these effects upon the brain and nervous system just described, Quinine has been called a *narcotic*—a medicine which you understand to be defined as first stimulating and then depressing vital action, and which acts upon the intellectual part of the brain. Quinine, however, scarcely answers to this definition, though in some respects it certainly approximates to the action of narcotics. In certain doses and instances, and generally in relation to some functions, it acts as a *stimulant*—in other doses and instances, and in relation to other functions, it certainly acts as a *sedative*; but it does not, in any ordinary quantities, particularly affect the

intellectual functions, producing either inebriation, sopor, or delirium; yet, in very large quantities, probably by causing congestion of the brain, it may and does produce some of these results. It does not, however, like alcohol, when this article is taken in quantities sufficient to produce its more characteristic effects, produce at first marked increase, and then as decided diminution, of action, together with the unequivocal phenomena of inebriation; nor, like Opium, when this latter is given in full doses, does it cause that general exaltation of action, followed by such certain and speedy diminution of power, with slow breathing and heavy sleep; neither, like Hyoscyamus, when this narcotic is given in its proper free doses, does the Quinine produce that slight and transient excitement, followed by that peculiar and protracted depression of the general powers and that marked derangement of the intellectual functions, so commonly present under the influence of the Hyoscyamus, called delirium. Though both stimulation and sedation are among the actions of Quinine, they do not follow each other in the same order, and are not attended by the other phenomena which characterize the operation of either of these representative articles of the three groups of narcotics, — Inebriants, Soporifics, and Delirians.

I shall not now enter into the discussion, and much less attempt positively to decide the question, whether the sedative effect of Quinine is usually primary and direct, or secondary and indirect, as the consequence of over-stimulation of the brain. I shall content myself with stating the fact, that the result of a full quantity of the article is, under many circumstances, a sedative influence on most of the functions, and, in general, with safety to the brain. In many states of the system then, and I can say and assure you that *generally* in doses of from five, ten, to fifteen grains, Quinine acts as a peculiar sedative, rendering the pulse softer and slower, diminishing muscular strength, relaxing the general system, causing free perspiration, reducing inflammatory action of a certain grade and kind, and producing a general quieting effect.

The circumstances calling for the administration of this article for its sedative effect, I shall endeavor to point out in a subsequent Lecture. What I wish to do now is, to impress you with the fact that Quinine, in large doses, is capable of producing these sedative results; and I may here add that these results are decidedly increased by combining with it full doses of Opium, Dover's Powder, or Morphine.

Quinine has a decided effect upon several of the *secretions*. I have just said that in free doses it increases the exudation from the *cutaneous surface*. It often does this in a very decided manner, and a part of its remedial effects is due to this mode of its operation.

It modifies, not less decidedly perhaps, the action of the *kidneys*. When Quinine is taken in considerable quantities into the stomach, it is soon found presenting itself in the urine. This is the principal channel by which it is removed from the system; and it is asserted by some, that its more perceptible effects upon the organism cease when it no longer appears in that fluid. In passing through the various tissues of the body, and out at the kidneys, it so modifies the organic molecular actions,—the metamorphic and secretory processes—as to increase, it is said, the solid constituents of urine. Experiments and observations for the purpose of establishing this point have not been numerous; but, not long since, I read, with much interest, an article in a southern Medical Journal, from the pen of a young man like one of you, detailing experiments made, I believe, during his pupilage, which went far to establish the fact just referred to. A young man can make experiments and collect facts as well as an older one; and I hope none of you will be deterred in consequence of your youth from doing what you may to advance the Profession of your choice. It would not be a difficult matter for any of you to test this point. For instance, let your food and drink be carefully and properly selected, and accurately weighed; let your exercise, rest, exposure, temperature, &c., be regulated by a standard; avoid all medicines; and analyze the urine, qualitatively and quantita-

tively for a few days: then take a given amount of Quinine per day for another period, continuing every thing else the same, and, by the same analytical processes, ascertain the results upon the urine. A sufficient number of such experiments would bring you to the truth. Something of this kind was done by the young man I have referred to,—the effects of Quinine upon the urine of several persons were observed, and the conclusion was arrived at that the article increased in a decided manner the solid constituents of the secretion. Considering the fact, that a large portion of the worn-out materials of the tissues are removed from the system by the kidneys, and the morbid effects which the retention in the organism of effete materials produces, the therapeutical value of this quality of Quinine can readily be imagined. Now, the fact as to this effect of Quinine needs more confirmation;—may we not hope that some of you will furnish it?

Other secretions are increased by this article. It operates not unfrequently as a *Cholagogue*—increasing, not as decidedly as some other medicines, but yet very perceptibly, the secretion of the liver.

The *Gastric* and *Intestinal Secretions* are unquestionably often, if not uniformly, promoted by it, and, under proper circumstances, probably all the other secretions of the body.

The *Menstrual flow* is often promoted by it; and my friend, and the ardent friend of this Institution, Dr. Z. PITCHER, the Emeritus Professor and Clinical Instructor of this University, regards it as one of our most efficient emmenagogues. He prescribes it for this purpose, and with much success. Dr. PITCHER also regards Quinine as having a peculiar effect, through the nerves, upon the molecular changes in the tissues, correcting morbid and favoring healthy ultimate nutrition; and often prescribes it, with reference to this action, in chronic diseases depending upon changes in the secretory and nutritive processes. In cases of struma, tuberculosis, &c., he often gives it in doses of from two to four grains a day, for many months together; and is able to refer to many cases as evidence of its good effects, given in this manner.

From the account which I have thus endeavored to present to you of the peculiar actions of Quinine upon the different organs and functions of the body, many of its uses in Medicine may be inferred; and in the next Lecture I will proceed to consider, more particularly, its relations to disease—its actions **as a therapeutical agent.**

LECTURE II.

GENTLEMEN :

At the last Lecture, your attention was occupied with a brief account of the source of Sulphate of Quinine, its physical properties and chemical composition, and its action upon the living organism in its physiological state; and, by the manner in which you have answered the questions just put to you, you have furnished gratifying evidence of having understood and remembered the statements presented. We are now prepared to proceed to a more particular consideration of this important article, in its therapeutical relations.

To the powers of Quinine in modifying and controlling diseases, and the mode of its application in the various cases requiring its use, I have given no small amount of attention. I have observed its effects, as administered in different doses and combinations, in a great variety of diseased conditions, and in a very large number of instances. Practicing, as I did, in this State for several years when the diseases to which this article is particularly applicable were very prevalent, and for several years more in the metropolis of Illinois and the North-West, where its use was daily required, I have perhaps had more opportunity of studying its actions than many of those distinguished gentlemen on the Atlantic sea-board, or in Great Britain, who write our text-books; and, while I have endeavored not to overlook any of the important literature on this

subject, I shall express to you no decided opinions which have not been tested and confirmed by my own experience and observation. But, independent of this, the intrinsic importance of the subject requires me to ask your particular attention to what may be said upon it, as I shall urge upon you also to give special attention to other leading therapeutical agents, such as opium, mercury, cathartics, and the hygienic remedies.

The most important therapeutical power of Quinine is that by which it controls diseases manifesting in their course marked periodicity;—and hence I have placed it under the head of *Antiperiodics*.

[I shall here introduce some remarks which were made on the general subject of Antiperiodics, introductory to a consideration of the particular articles of that class.]

Antiperiodics are medicines designed to remove the element of periodicity in diseases, or which are given for the purpose of interrupting those diseases which are marked by decided paroxysms, occurring, or tending to occur, at stated and regular intervals of time. Nearly all diseases are, to a greater or less extent, periodical—that is, they have periods, commonly diurnal, more or less perfectly manifested, of exacerbations and abatements. There has been no little discussion among medical writers as to the cause of this general tendency to periodicity in diseases, and many ingenious, and several plausible, theories have been proposed. I could not stop to enumerate all these hypotheses, extending back, as they do, to the period when almost every thing in Pathology was accounted for by the qualities, changings, and mixings of the four humors, even if I could now call them all to mind. It should be remembered that in health there is a rhythm of the vital processes—there are periods of comparative activity and repose of all the organs and functions, and the diurnal habits of sleeping and waking, of labor and repose, of food and abstinence, and the like, give a tendency to diurnal fluctuations in diseased actions. In some diseases, the morbid cause probably operates rhythmically; in others, the periodicity in symptoms depends upon the changed function of

an organ whose healthy life is periodical; while to a greater or less extent, in perhaps all cases, morbid organic periodicity depends upon an influx and accumulation of nervous power in some irritated part, producing symptomatic phenomena, which by violence of action exhausts, in a given time, the excitability of the part or of the system generally, requiring repose for a time before being capable of responding again as actively to the morbid impression. In this view, the intermittence is the fatigue, the repose, the sleep of the nervous system, under the more or less continued influence of a morbid irritant. During this rest, the nerves recuperate their suspended energies, and re-acquire their susceptibility to the morbid impression, and regain their power of causing other parts of the organism to respond in various abnormal actions. It is rational to suppose that thus general periodicity, or rhythmical fluctuations, occur in the common course of diseases.

But the periodicity now to be considered in connection with this distinct class of remedies which we designate as Antiperiodics, is more distinct and marked than that which belongs to diseases in general, and is believed to be produced by a distinct *aerial poison*, which has been called *Marsh Miasmata*, *Malaria*, *Paludal Malaria*, &c. This subject has been discussed, I have no doubt, ably, and probably sufficiently, from the Chair of Pathology and Practice. I shall not enter into the proofs of its existence, its probable nature or composition, its mode of conveyance, its particular action upon the system, or the circumstances which favor the production of its effects. I will simply say that the evidence is fully sufficient to convince me that there is such a poison, and as, too, in accordance with the general opinion of the Profession, I shall assume its existence.

This miasm presents itself in different degrees of concentration and power, if it be not of different kinds, from that which produces the mildest effects—such as moderate indispositions, derangement of secretions, slight “aguish feelings,” mild neuralgies, &c.—to those malignant congestive fevers which sometimes, like a stroke of apoplexy, crush out in a few hours the

vital spark. While the effects of this poison are sometimes trivial and almost imperceptible, they are, at other times, the most violent that can be well imagined; but in all instances, fortunately, they are more under the control of proper remedies than most other morbid phenomena of apparent equal severity.

A great variety of agents may operate as Antiperiodics—may break in upon periodicity of symptoms caused by this malaria, and may produce their effects in a great variety of ways.

When the poison causing these symptoms is feeble, and produces but slight derangement, a resort to any article of medicine which may remove a predisposing cause, or arouse the energies of the system, or in almost any manner decidedly impress it—such as a gentle alterative and cathartic, a saline which shall affect the secretions and depurate the blood, an emetic which shall impress the nervous system and operate as an alterant, a plunge-bath, a favorable change of air, a gentle tonic, a change of diet, or a strong and exhilarating mental emotion—may enable the system to resist the effects of the poison, and restore the balance of healthy action. When, again, the poison has nearly exhausted its force, and periodical symptoms recur from habit, almost any thing that will *perturb* the system—that will break in any manner upon its morbid associations—may restore the actions to their normal condition.

But I now propose to use the term Antiperiodic in a sense more restricted than that which would embrace so large a class of agents as have just been alluded to. I mean by this term, in its technical sense, a medicine which, by being taken into the system, enters the blood, and, when there, either by an effect which HEADLAND calls catalytic, directly destroys or renders inert a morbid material, the cause of periodic symptoms, or sets in action a chain of processes which accomplishes that destruction; or, by what is called a restorative action, supplies some wanting material in the blood, or causes it to be supplied, whereby this tendency to periodicity of symptoms, its cause and consequences, are overcome; or else a medicine, being

applied to the nerves and nerve centres, so impressing them as to materially modify or overcome the effects of the morbid cause, rendering the nervous system insusceptible to the morbid impression of the poison, and thus causing it to be inoperative in the production of the ordinary phenomena of these periodical or miasmatic diseases.

According to this view, Antiperiodics proper *may* operate in three ways:—1. By destroying a poison in the system, or changing a morbid process existing there; 2. By restoring, or causing to be restored, a deficient element or quality in the blood, or some necessary process in the system; and, 3. By so impressing the nerves and nerve centres as to render the system, in a greater or less degree, insusceptible to the impression of the miasmatic poison. According as the medicine operates in one or the other of these ways, it becomes a Catalytic Hæmatic, a Restorative Hæmatic, or a Neurotic.

That an Antiperiodic may have other powers, and produce other effects upon the system, of a curative nature, than those just indicated, is admitted; but the symptoms of periodicity, it is rational to suppose, are removed in some of these ways.

The phenomena by which a miasmatic influence in the system is indicated, and the particular circumstances calling for the use of Antiperiodics, I shall not dwell upon systematically and in full detail, as these matters more particularly belong to another Chair; though I intend to point out the most important indications for the use of this class of remedies, and the mode of their application. The whole subject of malarial diseases, however, is one of deep interest to all, and especially to those of the West; and I hope you have given, and will continue to give, especial attention to it. In former years it has been the case, it is so now in many localities, and may even be generally so again, that throughout the West, from July to November, the prevailing, the almost exclusive, diseases were of a miasmatic character; and, at all seasons and times, a large portion of Western diseases having other origins are decidedly modified in their symptoms and proper treatment by the miasmatic influence.

Now, in general terms, it may be stated, that whenever in a region where intermittent diseases, as agues, &c., are known to prevail, a marked, decided, and, what would be in other situations, an *unusual* periodicity of symptoms is present in the progress of a disease, whether that disease be a fever, a neuralgia, a diarrhœa, a dysentery, a congestive pneumonia, a bronchitis, or even a cutaneous eruption, an antiperiodic of some kind or another is called for. This statement is based upon the supposition, that wherever the miasmatic poison prevails, it may be present in, and more or less impress, the systems of all persons, and that when a disease, of whatever character, is present, the malarial poison may manifest its effects, modifying or aggravating the symptoms existing; and that it is desirable to remove this element which is mingled in the case. This view, I can assure you, is correct, and one of great practical importance. In many of these diseases embracing the miasmatic element, such removal of that element as antiperiodics are capable of effecting, will very often greatly change the whole aspect of the case for the better, if it does not sweep away all diseased action together.

This view includes the doctrine that more than one morbid cause may be present, and producing effects upon the system at the same time, causing a mingling of diseases. Of the truth of this doctrine there can be no doubt; and, if this fact be not kept in mind, you will in practice often meet with cases defying diagnosis,—at least, you will meet with cases which you will be totally unable to assign as exclusively belonging to any nosological class. Types of disease are constantly blending; and conversions take place, by one element, comparatively dormant in one stage of a disease, obtaining the ascendancy in another. Indeed, the morbid results of one disease may beget another of a different type; and thus, a disease having a single original cause may change its type in its course. This is true of fevers, and of other forms of disease. But I do not propose to dwell upon these points; my object now being simply to impress the fact that the miasmatic poison does operate in connection with

other morbid causes, and that many diseases in malarial regions present evidences more or less distinct of a miasmatic element in their composition, requiring attention in treatment.

I should, perhaps, say in this connection, that the malarial influence, even when sufficient to produce a controlling effect in many respects over the character of a disease, does not necessarily produce distinct and clearly perceptible periodicity in symptoms, though such periodicity is usually present. Indeed, some malarial fevers have their periodicity almost entirely covered by the local derangements or the severe general disturbances quite speedily produced; yet there is always a tendency to periodicity, and under all ordinary circumstances it may be distinctly traced.

The particular diseases for which these remedies that I have called, following the present usage, *Antiperiodics*, but which, with quite as much philosophical propriety, might be designated as *Antimiasmatics*, are most frequently prescribed, are intermittent and remittent fevers; and these may be regarded as the types of miasmatic or malarial diseases.

Into the pathology of these diseases I shall not fully enter. Whether the poison first makes its impression upon the nerves, the tissues of the various organs, or upon the blood, I shall not attempt to decide. That the blood is in a morbid condition in these fevers, there can be no doubt. The material poison, if there is one (and I have already expressed my decided opinion that there is—the facts in the case can not be accounted for on any other hypothesis), must enter the circulating fluid, and be carried by it to the tissues, nervous and others; and it is reasonable to suppose, that it produces some changes in that fluid. It has been supposed to operate there in the manner of a ferment, or to produce successive cryptogamic crops, &c. Of all this, we know nothing; but, whether from the direct action of the poison on the blood, or from its effect on the nerves and other organs concerned in the processes of sanguification, the blood soon becomes in a morbid state; and, in consequence of this, and the impression made upon other organs, the morbid phenomena are

produced. There is a disturbance of the calorific process — shivering comes on, during which congestion exists in the spleen and other internal organs: this is followed by the hot stage, presenting in a well-developed case all the usual phenomena of a high grade of fever, which, after a greater or less length of time, is succeeded by the sweating stage; and when this has passed by, a period of diminution, or more or less suspension, of symptoms occurs, to be followed by a repetition of the same phenomena. As this state of things continues on, the spleen, the liver, and other organs become involved in various morbid conditions and actions: the spleen becomes congested and enlarged, sometimes inflamed; the liver may be the subject of a similar irritation, — its secretion becomes deranged, sometimes increased and sometimes diminished; the stomach is often congested and irritated, its coats may be inflamed, and its functions are more or less impaired; the kidneys are also involved; and, as in all fevers, the nutritive processes, the formation and disintegration of tissues, is interfered with, the destructive far exceeds the formative processes, and if the secreting organs do not perform more than their wonted labor, effete matter rapidly accumulates in the system. By these various processes, if not by the direct action of the malarial poison, the blood becomes deteriorated and unsuited to its proper uses. When the disease has continued for a considerable length of time, decided *anemia* is manifested, and especially if the spleen be much affected. The co-existence of marked anemia, and structural changes of that organ, favors the opinion that its function is to manufacture blood corpuscles. The diseased conditions of the spleen and other organs, at first the *consequences* of a morbid agency, become the *causes* of other morbid actions; and thus a linked chain of pathological associations results, which is interesting to trace.

This miasmatic poison, when abundant and intense, may operate upon the most vigorous and healthy system; but there are various causes which predispose to its action. Among those most commonly enumerated, are exposures, fatigue, improper

food and drink, and all causes which exhaust the vital energies. The deficiency of respiration which exists in the rarified air of hot climates and seasons, and, as a consequence, if the same diet be taken, the retention in the system of carbonaceous materials, there is reason to believe, acts as a predisposing cause; and the deficiency of any of the secretions—of those of the liver, the kidneys, or the skin—by retaining effete or decomposing matters in the system, seems to favor the action of all zymotic poisons.

Now, Gentlemen, if the general views respecting the pathology of miasmatic diseases I have thus imperfectly presented be correct, the indications of treatment—the particular things to be accomplished, which I have so often told you must be distinctly in the mind before a medicine is prescribed—the indications in these cases are, first, to remove the poison or prevent its action; and, secondly, to remove or modify its effects.

As effects may become causes, and as the links in the chain of phenomena may be curiously arranged and united, the last named indication may become the first for which efforts at fulfilment are required.

Though to remove the original morbid cause, or prevent its action, would seem to be the first thing demanded, yet you may be called to a case at a stage of its progress when some of the effects of the original morbid agents, themselves then operating as causes of other serious results, require your earliest attention; and frequently, in removing or modifying some of these symptoms or effects, you prepare the system for the more safe and efficient action of the remedy which will fulfil the first indication,—that of neutralizing the miasmatic poison.

As a general rule, in the ordinary miasmatic fevers, at the stage in which you will usually be called in, my experience has taught me that to institute to some extent what is called preparatory treatment, before giving a direct antiperiodic, is on the whole best. Some practitioners commence the treatment ordinarily with an article designed to operate as an antidote to the malaria, and, if necessary, to correct some of the conditions produced by this malaria afterwards; and this mode in some

cases, especially if commenced at the very onset of the attack, succeeds well. Others are in the habit of combining with the malarial antidote—administering them at the same time—some articles designed to remedy those derangements of the functions which the original cause of the disease has produced; and in other cases this plan answers a good purpose; but, as already stated, a majority of cases will be best managed by first correcting some of the conditions present by other remedies, and after such preparation to administer the direct antiperiodic.

Among the conditions important to correct, are the obstructed and deranged secretions, biliary, gastro-intestinal, cutaneous, and renal—thus often relieving constipation, removing foul ingesta, depurating the blood of irritating and offensive materials, and diminishing the length of the paroxysms—the intensity and force of the febrile excitement. Again, local congestions, determinations, and inflammations, if they exist, should be abated or removed—at least, it is often important, that some effort, with this view, should be made before the antiperiodic is given. Often in the early stages of a miasmatic disease the fever is continuous; an intermission, or at least a decided remission, should usually, though it need not always, be obtained.

The means for accomplishing these purposes are various, but by the principles already pointed out to you, they will readily be suggested. For correcting the biliary and gastro-intestinal secretions, in ordinary cases, a mild mercurial, such as from four to ten grains of Blue Mass, combined perhaps with a scruple of Bicarbonate of Soda, and followed in a few hours by an unirritic, such as one of the neutral salts or Castor Oil, will be found beneficial. Should there be severe local determinations, such as to the head, the abdominal or the thoracic viscera, and sthenic plethora be present, the greatest relief would be afforded by a venesection. If unaccompanied with plethora, as is very generally the case, other means will be more appropriate,—such as revulsives and the milder sedatives. Should the fever be very active and disposed to be continuous,

cooling diaphoretic and diuretic drinks should be added to the means already indicated. Cold water to the head, and cool or tepid water to the surface generally, are very useful in most cases; and should there be great irritability of the system, and particularly of the stomach and bowels, and not very great determination of blood to the head; and usually after a cathartic, a full opiate—and the best form is Morphia—will procure the greatest relief, often determining an intermission of the fever with a free diaphoresis. A brief period of management by means of this kind—which I do not propose here more fully to specify—will prepare the way for the administration of the antiperiodic, rendering its action more efficient and safe.

In many of your books, *Emetics* are recommended as proper and ordinary preparatory means. There are undoubtedly cases, as when an attack has occurred just after a hearty or injudicious meal, where a dose of Ipecacuana or Sulphate of Zinc, or, what would perhaps be better, free draughts of tepid water, and a tickling of the throat to excite emesis, would be beneficial in removing offending materials; but any thing like the general administration of emetics in our miasmatic fevers can not be too decidedly or too strongly condemned. On this subject, I can not be restrained in the expression of my opinion by any authority contained in the books; and especially so, as nearly, if not quite all, of the enlightened Practitioners of the West will sustain me in this position. In all our fevers there is more or less tendency to gastric and intestinal irritability and irritation—a condition very generally aggravated and developed by the operation of emetics. In my early practice in the West, I used frequently to see the patients of a neighboring physician who followed the old practice of giving emetics, and, without responsibility in the administration, often witnessed the effects of antimonial vomits. Often have I seen patients prostrated as with cholera, requiring the most efficient measures to prevent collapse from hyperemesis and hypercatharsis; and when relieved of this peril, an obstinate gastric inflammation was apt to follow. But it was written in the books, that emetics must be given in

“bilious fevers”—the stomach must be cleansed; and what would do it so effectually as Tartar Emetic?

Drastic purgatives should receive the same unequivocal condemnation. At a somewhat later period, I knew another Practitioner of considerable note, who used, as a common prescription in fevers of this class, what he called his “Thunder and Lightning Pills.” They were composed, I believe, of Calomel, Gamboge, Scammony, and company—I am not sure of what precisely; but they nearly tore the intestines out of people, I have been told by some who have tried them, and they certainly often produced the greatest irritation and prostration, followed by gastric and intestinal inflammation. Treatment of this kind often converts a simple intermittent fever, which should be removed in three days, into a continued, protracted, intestinal fever, which endangers or destroys the life of the patient. When speaking of emetics and cathartics I shall have occasion to refer to this subject again, and shall hope to make such an impression on your minds as shall save you, and your future patients from great errors, and their results, in this direction.

By the means which I have only hinted at, as it were, you will, in a very few days, in all ordinary miasmatic fevers, obtain a distinct intermission or a very decided remission of the febrile symptoms; and then, after these gentle evacuations, is the time to administer your antiperiodic. As a general rule, it is best to wait for an intermission, or at least a well marked remission, before the antiperiodic is given; but if the case be malignant—if there be severe congestion or depression, at the risk, if there be any, of doing harm with an antiperiodic, it must be given without delay. Different antiperiodic articles operate in somewhat different modes in accomplishing this purpose. What is known respecting the action of Quinine in these cases, I will in the next Lecture proceed to discuss. I will simply add here, that after the periodicity is broken up, all the consequences of the disease left behind should receive attention. You should seek to restore a natural condition to all the organs and functions of the system.

LECTURE III.

GENTLEMEN :

In yesterday's Lecture, we took a brief view of Periodical or Miasmatic Diseases, and of the class of Antiperiodic or Antimiasmatic Medicines; and, by the review just had, I perceive you have not been inattentive to the subject. This view was necessary to be taken, in order to render intelligible what I have to say on the most important therapeutical applications of Quinine; for it is as an Antiperiodic that this article manifests its most wonderful and most beneficial effects.

The mode in which Quinine produces these effects as an antiperiodic—the particular manner in which it operates, whether by restoring some wanting material in the blood or the system, or by neutralizing a poison there, or by so impressing the organism, particularly the nervous system, as to prevent the poison of malaria from producing its effects—we do not positively know; but probably (may we not say, certainly?) it operates in one, two, or all three of these ways. There is no absurdity in believing that it operates in all. If so, it would be, according to the classification adopted, founded upon the *modus operandi* of medicines, a *Restorative Hæmatic*, a *Catalytic Hæmatic*, and a *Neurotic*.

I have, in the former Lecture, referred to some of the facts indicating that miasmatic fevers are blood diseases—at least in part; and if so, the remedy which more effectually and certainly than any other removes those fevers, we might plausibly infer operates as an hæmatic—operates in and upon the blood.

LIEBIG, in his Animal Chemistry, states, that certain bitter vegetable substances are very analogous in composition to a

certain neutral principle called *taurine*, existing in the bile. He has shown that, to a large extent, the elements of the bile, after being poured into the intestines, and after performing their office there, are re-absorbed and taken again into the system—little else than the coloring matter of this secretion being really excrementitious. He found that if bile was injected into the rectum, it was absorbed from that viscus, and that it did not pass out into the urine. He infers from these facts, that these absorbed elements are appropriated by the system, and are useful and necessary to its integrity; that when the bile-secreting function of the liver is so deranged that the necessary amount of the main bile-principle, *taurine*, is not elaborated, unpleasant symptoms are the consequences, and the place of the *taurine* must be supplied, either in kind or by a substitute. His idea would seem to be, though he does not quite clearly express it so, that when the liver does not properly act, some of the elements out of which bile is formed remain in the blood in a form to do mischief, and that some other elements or compounds which the liver is alone capable of forming, and which are required in the system, are, by this deficient action of the liver, absent; and when this deficiency exists, particularly of *taurine*, the vegetable bitters, and particularly *Quinine* and its analogues, are indicated, under the idea that they are similar substances, and will supply its place.

HEADLAND adopts this view as probable, and points out analogies between *taurine* and the bitter vegetable principles. They are both bitter to the taste, are composed of the same ultimate elements,—the *taurine* possessing a little more oxygen than the bitters; but oxygen is always readily supplied in the system. The ox-gall, when there is a deficiency of bile, operates as a general tonic, and, it is thought by some, produces more tonic effect than can be accounted for by its action upon the alimentary canal and the process of digestion simply. From these analogies, and other observed facts respecting the action of *Quinine* in moderate doses in health, HEADLAND draws the conclusion that this article is not unnatural to the blood, or at

least that it may exist there in moderate quantities in health without detriment, and that in such moderate quantities it is retained in the blood and appropriated by the system: and in disease, he concludes, that when there is a deficiency of the bile element it acts as a restorative hæmatic. If these views be admitted, they will assist in accounting for the improvement in those processes of secretion and ultimate nutrition, which, in the estimation of the competent authority (Dr. PITCHER) referred to in the first Lecture on this subject, is produced in tuberculosis and other similar diseases by the long and continuous use of Quinine in doses of a few grains per day.

That it may act as a restorative hæmatic in many cases of miasmatic disease, I see at least no reason to deny, but rather reasons for supposing probable; especially when it is considered that in these diseases there may be a deficiency of some element, which, if present in proper quantities, would prevent the action of the miasmatic poison. Certain it is, that all persons exposed to the malarious influence are not attacked with malarious diseases, and possibly only those are affected whose systems are rendered susceptible by the absence of these bitter compounds.

But still, if these fevers are produced, as I believe they are, by a poison in the blood, it would seem most likely—at least very reasonable—that the article of medicine which arrests the action of that poison most speedily, does so by operating directly upon it, neutralizing its poisonous qualities. From this consideration, I would infer its catalytic effect; that is, that it operates by destroying a deleterious material, or arresting a morbid process in the blood, especially in acute cases, and when acting as an antiperiodic in contra-distinction from its action as a tonic. This view is strengthened—at least the exclusive restorative hypothesis seems disproved—by the fact, that in violent cases of miasmatic fever, Quinine must be given in order to produce prompt effects, in quantities larger than are retained in the blood—to such an amount as that it freely appears in the urine. Arsenic, which often breaks up agues almost as promptly, and some think more permanently, than Quinine, no

one will regard as supplying directly any needed element to the blood and the system; and from the slight apparent effect upon the nervous system which even very efficient anti-periodic doses of this metallic oxide produce, we conclude that it operates as a catalytic,—as a neutralizer of the poison. Is it not reasonable to suppose, then, that Quinine operates in the same way?

But Quinine impresses strongly the nervous system, and may produce its effects—in my judgment it does, in part, at least—by exciting a new action in the system incompatible with the malarious fever action, producing what has sometimes been called a constitutional counter-irritation, or cure by substitution or supercedence. In other words, the impression made upon the nervous system by the medicine supplants, or prevents, the action of the poison or morbid cause. The nerves are so occupied and impressed, that they do not respond, in their peculiar morbid actions, to the irritation of the morbid agent.

Now, neither of these three modes of operation is irrational, and they are by no means incompatible with each other. It is an error to suppose that a medicinal agent must produce all its effects by a single mode. This is a limited, a partial, and an untruthful view. Most medicines operate in more than one way—operate often upon distinct and different principles, illustrations of which truth I have frequently given you; and there is no reason for saying that Quinine is not one of these articles. It operates, not unlikely, in all the different modes indicated—all tending to produce the desired results.

It has such a striking effect upon the condition of the enlarged spleen, in intermittent fever, as to have led PIORRY and others to suppose that it operates specifically upon that organ, and, in some way, by this means cures the fever. Whether or not it does thus act directly on the spleen, in reducing its dimensions, is not fully established. To make it appear that it cures the ague in this way, it would be necessary to show that congestion and enlargement of the spleen are necessary conditions in the causation of the disease. The enlarged spleen is a

common consequence of the action of the miasm, rather than a cause of the febrile phenomena, and it is doubtless diminished in size because this poison is neutralized and its resulting phenomena are arrested. It may be urged that enlarged spleens are diminished in cases where the ordinary phenomena of a miasmatic fever are not manifest; and this is true: but a miasmatic influence may be operating upon the system in the production of morbid conditions, without there being a full development of febrile symptoms. Indeed, in many of these obscured, and partially suppressed, malarial diseases, internal organs suffer more profoundly, the blood is deteriorated more completely, and the vital energies are exhausted more rapidly, than in open, well-developed cases. It is probable that in the ordinary phenomena of a regular paroxysm an effort is made to resist the poison, and that particularly in the sweating stage a poison is eliminated from the blood. That in this stage, some morbid, or at least unusual, material is thrown off by the skin is perceptible to any one having ordinary olfactories;—the “ague odor” is characteristic and well known. Quinine operates with as much curative power upon these masked, as upon the more open, forms of malarial disease, and by removing the cause suspends the consequences, among which is enlargement of the spleen; still, it is not impossible that Quinine operates in a more direct manner in diminishing enlargement of the spleen, and I must say that I have seen some of these enlarged organs diminished by this remedy where there was no other evidence of an existing miasmatic influence present. With me, the direct action of Quinine upon the spleen, in reducing its enlargement, is an open question;—Prof. Wood does not admit it. There is, however, no sufficient evidence to believe that by its acting upon the spleen miasmatic fevers are cured.

As an antiperiodic, Quinine is indicated in all diseases where other articles of this class may be given—that is, where the disease is miasmatic in its origin, as indicated not only by periodicity, but by all the other symptoms and circumstances; and it is also indicated where the miasmatic element is present in

the course of other diseases modifying their characters. This is the very general rule; and the exceptions are in those cases only, where, under some peculiar circumstances of disease or idiosyncrasy, the Quinine is found by experience to be objectionable, or to disagree. Where the miasmatic influence exists and is a prominent feature, the Quinine very seldom does mischief, notwithstanding inflammation be present, provided its use is judiciously managed. Its ordinary effects are believed to be modified by the presence of malaria. Serious lesions, such as active congestion or inflammation of the brain, and some cases of inflammation of the mucous membrane of the stomach, contra-indicate its use more than other conditions of congestion or inflammation.

The combination of Morphine with the Quinine will generally prevent its irritating the stomach in these cases, but if great fears be entertained that the Morphine will not, the Quinine may be administered per rectum, or endermically, with safety and success. Morphine in free doses, combined with it, will very commonly so far allay the irritation and blunt the sensibility of the inflamed stomach as to prevent its responding to such irritating qualities as the Quinine possesses; and, in most cases of these fevers complicated with gastric inflammation, even if the latter should be temporarily increased by the medicine, if the malarial influence be overcome and the paroxysms of fever be arrested, the local difficulty will readily subside. And it is seldom that a quantity of Quinine necessary to break up the fever, if properly guarded by Morphine, will produce as much irritation of the stomach, or in fact any part of the system, as a paroxysm or the return of fever would do. Indeed, in some cases, the stomach even, so far from being irritated, seems soothed by Quinine.

Though Morphine is so efficient in modifying and preventing the irritating effects of Quinine on the inflamed mucous membrane of the stomach, and most other parts of the body, it does not usually prevent, but often rather increases its tendency to injurious effects in active congestions and inflammations of the

brain complicating miasmatic fevers. But, in all these cases, the question will arise, Whether more mischief will be done to the brain by the Quinine than by the continuance of the fever which the Quinine will arrest? In complications of this kind, where the stomach and bowels are not inflamed, Arsenic may be given as an antiperiodic, as this is not likely to irritate the encephalon; but, if a complication of fever with inflammation of stomach and brain occur, I would risk the Quinine rather than the Arsenic. Give the Quinine in these, and indeed in all other, cases of miasmatic fever, especially if acute, in free and decided antiperiodic doses *during one intermission*, apply cold water to the head, and use, perhaps, revulsive measures;—use, I repeat, the Quinine in sufficient quantity during *one intermission* to break up the fever, and, then, if there be local irritation especially, have done with it. Knowing the importance of this principle, and how frequently it is violated, I can not express it, and impress it upon you, too strongly. Where there is danger of producing irritation with Quinine, *do not protract its effects*; where Quinine is given for antiperiodic purposes in cases complicated with inflammation, *give it in sedative doses*.

The doses of Quinine, as has already been stated, which produce sedative effects, are *free doses*, from five to ten or more grains—from a scruple to half a drachm in a few hours. The quantity usually necessary to break up a miasmatic fever is one scruple—often less will do, seldom more is necessary; and this quantity is usually best given in four doses, and always during one intermission.

In intermittent fevers complicated with other inflammations than of the stomach and the brain, the Quinine seems generally to do good to the inflammation as well as the fever element—it often sweeps away the whole together. Its administration should be preceded by attention to the secretions—perhaps by the use of means to directly reduce the force of the inflammation; Morphine should generally be combined with it to render its action more sedative; and then, by giving it in full doses, the work of cure is often accomplished.

I have been supposing cases of miasmatic fever complicated with inflammation and active congestion; and these cases not very unfrequently, in some localities and seasons, occur. But by far the greater number of these fevers have no genuine inflammatory complications, and the congestions are often of a passive rather than an active character. Conditions of decided general and local *irritation* are more frequently present, being very active when the paroxysm is on, and subsiding with its abatement. Even when a local inflammatory process is developed,—when stasis and effusions, the more essential conditions of this process, have occurred, the nervous and vascular irritability is, proportionably to other phenomena, more intense, and fluctuates with the conditions of the fevers. It is a kind of inflammatory action so connected with, and dependent upon the essential fever, that the most effectual means for controlling the inflammation is to remove the fever. It is bad practice to allow the fever to continue until the local inflammation is subdued; often, the local inflammation can not be subdued until the fever is arrested. If there be plethora, there may be a necessity for resorting to depletion; but if the lancet be used, Quinine should speedily follow it. A mild alterative and saline purgative or two will usually be required, but the Quinine should not be long delayed; and in all these inflammatory complications, except, perhaps, where the local seat is the brain, the opiate should be combined with the antiperiodic. This may not be the teaching in all your books, but it is the true teaching, nevertheless. You must not forget that in free doses Quinine is capable of a decided sedative effect; and that, even independently of its anti-miasmatic powers, by its relaxing and diaphoretic and other peculiar actions upon the nervous and vascular systems, it is capable of controlling inflammations of a certain character and grade, and especially such inflammations as occur when a miasmatic poison impresses the system. Still, when given long, it is capable of producing irritation, and particularly of the brain and the stomach. It should not, then, be long continued, lest this irritation be induced. Its antiperiodic effects are

speedily obtained, and for this purpose it need not be protracted. And particularly let me warn you against giving this medicine, in acute cases of high excitement, in small, repeated, and long-continued doses. I have known many Practitioners to give in cases where they were doubtful whether the Quinine would be borne, small doses, such as a grain, more or less, once in a few hours. These doubtful cases, in consequence of imperfect intermissions, or of high febrile or inflammatory excitement, are the very cases in which, if any at all be used, larger doses must be boldly given; if the doses be insufficient to act as a sedative, and not large enough to interrupt the paroxysms of fever, you will get an irritating effect of the Quinine combined with the irritation of the unbroken fever, and your patient is made worse. Give it freely, or not at all—give a full antiperiodic quantity, or none.

In my notes, I have it written, "*Impress this.*" I hardly know how to do this, otherwise than by reminding you of the actions of Quinine already stated,—that in small doses it acts as an excitant, but in large doses as a sedative—of a peculiar kind to be sure, but yet a sedative to many of the functions; that free doses are necessary to produce a prompt antiperiodic effect; and that these cases require promptness in their arrest, and the avoidance of excitation. I might cite cases for illustration, but I must be contented with assuring you that these principles, supported by reason, were deduced from observations, and have been verified by abundant experience. These are not notions peculiar to myself, though, with some aids to be sure, I wrought them out long ago at the bed-side of the sick. They are fast coming to be the views of the more enlightened of the Profession who have had large experience in this class of diseases.

I have already spoken several times of the combination of opiates with Quinine in these fevers having inflammatory complications. The opiate also should be given in decided doses, ranging from one-sixth to one-half a grain or more of the Sulphate of Morphine, given with from four to eight grains of the

Quinine, once in from two to three or four hours, taking care to have administered the requisite scruple or more of Quinine during one intermission, and as much of the Morphine as may be taken without too much narcotism.

There are other cases than the inflammatory complications requiring the addition of Morphine. Whenever there is irritability of the general vascular system, and especially of the nervous system, it is indicated. Opium, indeed, has some anti-periodic powers, and it very generally enables the Quinine to be better borne. When gastric or intestinal irritations are present—when vomiting or diarrhœa manifest themselves, as they not unfrequently do,—I need scarcely say the opiate is specially demanded. When the skin is rather dry, and the intermission is not perfect, a full dose of the Quinine and Morphine will often produce the most abundant sweating, and with proper repetitions, the crisis will be past. When the secretion of the liver is markedly deficient, Mercury, with advantage, may be joined with the Quinine. When the skin is dry, and husky, and the stomach is not too irritable, diaphoretics may be given at the same time with Quinine.

In some cases of diarrhœa, Tannin may be added. It nearly destroys the bitterness without impairing the virtues of Quinine, adding the quality of astringency to the combination. The *Tannate of Quinine* is an officinal preparation, combining to a large extent the qualities of both the Quinine and Tannic Acid. It is used instead of the Sulphate in cases accompanied with much relaxation and profuse secretions and discharges—such as where there is excessive sweating and passive diarrhœa.

Various other combinations may be required in complicated or peculiar cases; as, where there is much depression, stimulants will be needed—where there is much irritability, and Opium can not be borne, other narcotics or nervines may be substituted, &c. But Quinine is regarded as having curative relations to various other diseases than those which are malarial; and in the next Lecture, after discussing in a general way some of these relations, I propose to point out somewhat more particularly the

mode of using it in several varieties of paludal fevers and other special diseases. In pursuing this course, some of the ideas already advanced may be repeated, but in different connections and in more directly practical points of view. But, Gentlemen, in medical as in moral teaching, "line upon line, and precept upon precept" are necessary to embed important facts and principles deeply and fixedly in the mind.

LECTURE IV

GENTLEMEN:

In this Lecture (which will conclude what I have to say on the subject of Quinine, as intimated before we last parted), I propose to consider the relations of this article to some diseases not considered malarial, and then to speak somewhat more particularly of the varieties of miasmatic fevers, and of the practical application of this great remedy to their different forms.

A few years ago, Dr. DUNDAS, of Liverpool, recommended strongly Quinine in free doses in *continued fevers*, typhoid and typhus, with a view of cutting short the progress of these diseases. His testimony is to the effect, that in a large majority of cases it will speedily break these fevers up. This announcement from what was regarded as respectable authority, arrested fully the attention of the Profession, and many trials have been made to test the correctness of the statements. I have given this treatment a trial in my own person, and have also tried it and seen it tried in many other cases, and therefore have a right to the expression of an opinion. I must assure you that respecting this matter there is some mistake. As already intimated, different forms of fever may be blended in the same case. Two or more poisons may operate upon the same system at the same time. A fever, the result of a malarial and of another poison combined, may be "continued" in its character—indeed, a pure malarial fever is not necessarily so decidedly paroxysmal as to

be regarded as "intermittent" or "remittent." It is, therefore, sometimes difficult to distinguish a fever, malarial in its course, from one originating in some other poison or morbid agency. Mistakes in diagnosis may easily occur. Dr. DUNDAS's cases of fever reported as "jugulated" by Quinine may have been partly or wholly malarial. I believe they were. According to my own observation, and that of all the medical gentlemen with whom I am acquainted and have conversed on the subject, Quinine does not control, in the way of "breaking up," a pure typhoid or typhus fever. When a miasmatic or malarial influence exists and prevails, that element, and often the whole disease, will be controlled by Quinine. I have often seen cases of continued fever, but marked by regular paroxysms of great exacerbations, have the paroxysmal character removed by antiperiodic doses of Quinine—the appearance of the fever being materially changed, but continuing, nevertheless, in the regular form and course of a typhoid fever. Other cases, even less paroxysmal, are sometimes entirely broken up by this remedy, it is true, but these cases I have regarded as malarial in their origin. Quinine in antiperiodic doses does not usually materially injure a patient in a case of pure typhoid fever. As a practical matter, in doubtful cases, if the brain is not too much congested, Quinine may be tried in full doses for a short time. The character of the fever, by this process, will be tested.

The real use of Quinine in typhus and typhoid fever, is in smaller but continuous doses, with a view of sustaining the system under the depressing influence of those diseases. Used in this manner, it is often very useful, and should generally be combined with small doses of Opium, especially where there are intestinal lesions. It must, however, be acknowledged, that in some conditions of the system, Quinine seems to exert an immediate and direct, though transient, *febrifuge* influence, independent of its malaria-destroying, or antiperiodic qualities.

The term *febrifuge*, used in its literal sense, means a remedy capable of driving away a fever. As now used, I mean by it a medicine which directly removes or mitigates febrile symptoms,

such as increased heat, excitement of pulse, &c. Now, the sedative and diaphoretic powers of large doses of Quinine enable it, in some cases, to ultimately abate the heat, &c., when given during their presence. But such effects, in the absence of a malarious cause, are temporary, and it should seldom be prescribed for such a purpose. There is danger of doing mischief to the brain if sedative doses are continued long, and there are other articles which, for this purpose, are more effectual and safe.

The late Dr. HARRISON, of Ohio, while acknowledging this direct febrifuge influence of Quinine, thought it could scarcely be attributed to its sedative action; "but that, by a sudden and powerful impression upon the nervous system, it creates a substituted action for the febrile disturbance, and this, aided by its diaphoretic tendency, subverts the catenated train, or procession of phenomena, which constitutes fever." He regarded it as acting, as you will perceive, by the method of substitution, or as a supercedent. However this particular point may be (and I do not see why this explanation will not apply to many other articles regarded as sedatives), Quinine often exerts a direct febrifuge influence of this kind, when given in free doses; and this effect is increased by combining it with Morphine.

When, therefore, there is a strong and clear indication for an antiperiodic, in consequence of a malarial element being present, you need not be prevented from using the Quinine, though you may not be able to get an intermission of the fever, or may not subdue all inflammatory action. Indeed, as already intimated, certain forms of inflammations, particularly those of a congestive character, are diminished and controlled by Quinine, especially when Opium or Morphine is combined. You may not have received these ideas from your books, but yet they are true. However inconsistent with pre-conceived notions, or however apparently so with any other statements that may have been made about Quinine, it has under many circumstances a tendency to equalize the circulation and remove congestion, and often, too, in an eminent degree.

In cases of the severer congestive forms of malarial or other fevers, its immediate tendency is usually to relieve that congestion; and, further, while it exerts, in some respects, a sedative influence—while it may diminish the pulse and relax the surface,—it, at the same time, so impresses some of the organic functions as to sustain, when in danger of suspension, the powers of life. In these alarming depressions, usually regarded as violent congestions, when the nervous system has received a deep benumbing shock, and lies prostrate beneath the power of the disease, this remedy seems to release the innervation from its oppressed condition, and awakens a degree of re-action, which sometimes is developed into a degree of open fever much preferable to the previous depressed condition; or, what is more likely and still better, at once cuts short the catenated train of symptoms—relieving the oppression, removing the congestion, and preventing further fever. Patients in these most alarming conditions are often speedily restored to comparative safety and a state of convalescence by the free use of this glorious medicine.

You will pardon a little warmth of expression on this subject in one who has served a long campaign in combating the malarial diseases of the West, and who has almost never found this article disappointing his hopes. Why, Gentlemen, without Quinine, or some similar article, the material and social development of this whole region must have been retarded for at least half a century, if, indeed, it had not been prevented altogether. What would Ohio, or Indiana, or Illinois, or Wisconsin, or the young Iowa, or Michigan have been at this day, had not their early settlers who cleared up their forests and broke up their prairies, established their institutions, and laid the foundation for their large prosperity, been protected from the “pestilence which walketh in darkness and destroyeth at noon-day,” by this agent of power? Where would have been our Agriculture and our Commerce? where would have been this Granary of so large a portion of the world, literally feeding from its overflowing fulness the people of the East? where would have been our

Churches and our Institutions of Learning? where would have been our own noble System of Free-Education, the peculiar honor and glory of our State? where would have been our Common, our Union, and our Normal Schools? and to crown all, as the culmination of all, where would have been our University, with its various departments, attracting to its halls young men of energy and merit from nearly all the States of the Union?—had it not been for this, as the chief instrument in the hands of the Physician, standing as he did like an angel with a flaming sword, guarding, in the early and the subsequent inhabitants, the citadel and fountain of health and life? It may, at first view, seem extravagant to attribute so much to an article, extracted from a foreign bark in a chemist's laboratory, and kept in small bottles on a druggist's shelves; but all who know the facts, and have reflected upon the subject, will acknowledge the literal truth of what I have said. But this is a digression, though one perhaps justifiable, especially in these times when it has become too much the custom to disparage the Physician and the agents he wields.

I was saying that Quinine often equalized the circulation, removing congestions, and controlling to a decided extent various congestive inflammations. In accordance with these principles, it is found useful in cases of *Erysipelas* of a sub-acute and congestive character—in many of the cases of epidemic erysipelas, and especially where there is a tendency to gangrene or free suppuration. The doses here should not always, or even generally, be of a sedative character, but tonic rather; and other preparations of the Bark where the cases became protracted may be preferred.

The Muriated Tincture of Iron I shall speak of hereafter, and of its striking effects as a remedy in this disease.

Quinine is often very useful in erysipelatous and suppurative and gangrenous inflammation, arising in connection with traumatic injuries. In these cases, it should be given in tonic rather than sedative doses, and in connection with a good diet and sometimes with stimulants.

Quinine is an important article of treatment in some cases of *Pneumonia* — especially those occurring in malarial districts and assuming a low, or what is sometimes called a typhoid form. Where much periodicity is manifest, and the malarial influence is still active, antiperiodic doses will be required. Where Quinine is used in the more acute cases, its sedative effects for a time must be obtained; but in the slower and more protracted cases, it may be given with much advantage in smaller doses, continued for days, and sometimes weeks together. My friend, Dr. PITCHER, to whom I have already more than once referred, is very partial to the use of Quinine in doses of about two grains, two, three, or four times a day, in slow pneumonias and broncho-pneumonias, with more or less pulmonary effusions, or exudations, so apt to follow malarial and typhoid fevers. I have witnessed several excellent recoveries in such cases, by the use of this article in his hands.

Many cases of *Diphtheritic Inflammation*, including the lower grades, especially, of *Membranous Croup*, are believed to be much under the control of free doses of Quinine. Indeed, very many of the inflammations of the mucous membranes, notwithstanding Quinine sometimes irritates the *gastric* surface, are favorably affected by it. I shall have occasion hereafter to speak more particularly of croup, as it belongs to the “Diseases of Children,” and will then point out the circumstances in which I regard Quinine as useful, and detail the manner of its application. I shall then tell you that croup is often markedly periodical in its symptoms, suggesting by this fact and others the use of Quinine.

Many cases of *Dysentery*, Gentlemen, are dependent upon malarious causes, and present marked periodicity in their symptoms and their course. When the liver is congested, as it often is when a malarious influence is present, the portal circulation is of course obstructed — the blood does not freely return from the parts supplied by that system of vessels, and congestion and inflammation of the other abdominal organs are apt to occur. Dysentery from this, and perhaps other influences of the mala-

rial poison is no unfrequent result. If a developed malarial fever be combined with dysentery, during each paroxysm of the fever the symptoms are greatly enhanced; and I need hardly say that in all such cases the leading indication is to arrest the paroxysmal fever. Of course Quinine is the remedy; and, during its operation in antiperiodic quantities, it does not enhance, but, if combined with Opium it particularly diminishes, the dysenteric irritation. Other means proper to dysentery must not be neglected, but they will usually be applied to little purpose while the paroxysmal fever continues. The great utility of Quinine in these cases is beyond what I have time or even power to express. I might relate many cases taken from the very jaws of death by the use of Quinine; some of them now in my mind having been nearly sacrificed to the delusion of Homœopathy.

These remarks made respecting dysentery will apply to a greater or less extent to *Diarrhoeas*, *Enteritis*, and *Cholera Infantum*. I need not here speak particularly of these cases. They are often connected with a malarious influence and present marked periodicity of symptoms, and in all such cases antiperiodic doses of Quinine can not properly be withheld. Some of these cases not markedly periodical will, nevertheless, yield promptly to Quinine. In a case occurring in a malarious region not yielding readily to other treatment, whether distinctly periodical in symptoms or not, I should regard myself as not having done my whole duty until I had tried the efficacy of this remedy. In all these cases, it should be given—as when the design is to break up a fever,—in full antiperiodic doses, and then be suspended. It must be borne in mind that large doses of Quinine *long continued* are capable of producing irritation and mischief, particularly of the brain. One or a few impressions of the article seldom do much injury, whereas many may. This is not peculiar to Quinine. One or a few fits of alcoholic intoxication will not produce delirium tremens, but the protracted use of alcohol—many fits of intoxication—often will produce this disease. Because Quinine is innocent in large doses when its impression is continued for a few hours, we can not infer that it

may be used in like manner for as many days, with the same freedom from injurious results. A good general rule is, though doubtless subject to some exceptions, that short work must be made with large doses of Quinine.

Of the use of Quinine in *Asiatic Cholera*, I have some words to say. On this subject I speak from an experience by no means limited, and my views are very firmly fixed. I regard Quinine in this terrific disease, as it generally presents itself, as a very important remedy; and in the form this pestilence as it prevails in some seasons and localities, the use of Quinine is an essential part of any thing approaching successful treatment.

Now, Gentlemen, I wish to express to you my strong conviction, that cholera, so generally fatal when left to itself, and in some of its forms so apt to be fatal under any management, is still much more under the control of proper remedies skillfully applied than the general literature of the Profession on the subject would lead you to suppose. I shall not here enter upon its pathology, and shall say but little of its general therapeutics. I will speak more of its treatment when upon the subject of Opium; for after all that has been justly said against the too free and the injudicious use of Opium, it is the most important remedy in the management of the disease. But Quinine has its important uses, and of these I shall briefly speak in this connection.

There are two leading objects in cholera for which it may be given—two distinct indications which it may fulfil. In what has been called the congestive stage of the disease,—when the blueness has come on, the respiration having been diminished, the capillary circulation, perhaps by spasm of the smaller vessels having been obstructed, and the patient from loss of the fluid portions of the blood, from deficient aeration of that which remains, and probably from a more direct depressing effect of the cholera poison upon the nervous system, is ready to sink from perversion and suspension of the organic functions—Quinine in doses of three, four, or six grains, often best combined with such stimulants as Ammonia and Mustard, repeated once in an hour or

two, will so modify the organic actions as while spasm is relieved and congestion is removed, the vital energies will be sustained. In cases of this kind I am supposing that the discharges have been restrained or checked by Opium, Camphor, and astringents, and that an effort has been made to excite the biliary secretion by appropriate doses of a Mercurial; and if much narcotism has been induced by the Opium necessary to arrest the discharges, the Quinine, aided by as free doses as can be borne of Coffee or Tea, will relieve this narcotism and tend to prevent the suspension of the vital functions. The nice point in the management of cholera is to administer Opium in the active stage, so as to allay the irritation of the gastro-intestinal membrane, and control the profuse and rapidly-exhausting serous discharges, and at the same time not to produce such a degree of narcotism as shall operate to diminish, to a dangerous extent, the process of respiration and the aeration of the blood. The irritation must be allayed and the profuse discharges arrested, or in a majority of cases death is inevitable. No article can be compared with Opium in accomplishing these objects. But Opium produces the other effect alluded to, when given in free doses; and this is an effect which, in the stage of the disease approaching collapse, is most to be dreaded. A leading condition in the collapse, and one of the causes of death is the imperfect oxidation of the blood. The whole of this fluid becomes dark and venous; the full narcotic effect of Opium in this stage increases the difficulty and dangers; and it is a matter of great delicacy and difficulty, to avoid the fatal Scylla of irritation and profuse discharges on the one hand produced by the cholera cause, and the equally fatal Charybdis of profound narcotism on the other which may be produced by the remedy. The most moderate degree of the influence of Opium which will be at all efficient in arresting the discharges, will diminish to some extent the arterialization of the blood. Now, according to my observation, Quinine will enable the system to bear, without fatal results, a larger quantity of Opium than can be borne when it is not given. Coffee and Ammonia are also efficient agents for this

purpose, and should not be neglected when the discharges are checked and the stomach will bear them; and, under the same circumstances, the Quinine is also important. I have dwelt upon this idea, because I regard it as important.

But there is another object in the treatment of cholera, at least as this disease presents itself in some localities and seasons, for which Quinine is much more important. I have already had occasion to say that different diseases are capable of combination in the same case. Two zymotic poisons may exert an influence upon the system at the same time, as well as two medicines, each modifying the effect of the other.

Now, in the cholera, as it prevailed in Chicago, particularly in the year 1854, a malarial influence was combined with the cholera cause, as was manifest by the symptoms assuming, besides other features, a distinct periodical character. An attack of cholera, commencing on a given hour of one day, and where the symptoms were all controlled, would, in many of the cases, re-appear on the next day, or the one following, at the same hour; and few would survive this return of the disease. In some of the cases, there would be a perceptible chill, accompanied, or soon followed, by the most active cholera symptoms, with genuine rice-water discharges, collapse, and death. It is well known that not unfrequently in malarial fevers, when no cholera is prevailing, the paroxysms are accompanied by profuse, serous vomitings and purgings—and by cramps, profuse sweats, coldness, and great depression—symptoms strongly resembling Asiatic Cholera. When the system is subject to both a cholera and a malarial influence, should the latter produce its characteristic chill, congestion, &c., the cholera symptoms are likely to be precipitated; a combination of the diseases exists, the cholera symptoms being brought on by the chill and its accompanying conditions. It is well known that when the cholera influence is prevailing in a region, a variety of perturbations of the system, such as an inordinate meal, excessive fatigue, an active cathartic, &c., will produce attacks: in like manner, a paroxysm of a malarious fever, is almost sure to produce such attacks.

The importance of Quinine in all such cases will be at once appreciated. It is the only reliable article in preventing such returns. Given in full antiperiodic doses, as soon as the vomiting is controlled and the stomach will bear it, Quinine is nearly as effectual and important to the patient as the application of a ligature to a wounded artery from which his life-blood is fast flowing. I could not tell you how many human lives I believe I have been instrumental in saving, by detecting this fact and adopting this treatment. The pleasure in contemplating these cases is alloyed only by the memory of a few others which terminated fatally by recurrence of the disease, after the patients were thought out of danger, such cases occurring before I understood these relations and before I thus used this remedy. In the place and at the time referred to, no case was safe, though a chill was not detected, where Quinine was not used; when the immediate symptoms were controlled, and the Quinine was given, relapses did not occur. I have no doubt that very frequently in cholera these complications exist; and as Quinine is so often useful for the other purposes referred to, I can but strongly advise, as a general rule, that as soon as the vomiting and purging is checked, Quinine be commenced in five or six grain doses, and repeated so that about half a drachm be given and *retained* within a few hours, or before a diurnal period shall return. You may not find this advice in your books, and it therefore should be deeply engraven upon the tablets of your minds.

In a former Lecture I alluded to the use of Quinine in *Tuberculosis*, given with a view to modify the organic process of the morbid ultimate nutrition by which this exudate was deposited; and you will remember the pathological specimen sent from the Hospital in Detroit some time since, shown in this room, where old cicatrices existed in a pair of lungs, the patient dying from a combination of other diseases, but who some three years before presented symptoms of advanced phthisis, and was treated by Dr. PITCHER for many months with Quinine. He took from two to four grains a day for

nearly two years, with the results upon the tuberculosis such as you witnessed. This was a very suggestive and striking case, and taken in connection with others should lead to further trials of the remedy in this usually hopeless disease. I have already referred to the use of this remedy in some cases of sub-acute pneumonia and bronchitis; and, in those cases where there is fear of a tuberculous termination, it would seem particularly worthy of a trial.

In various *Cutaneous Eruptions*, Quinine has been used, and is very efficient in many cases occurring in malarial regions. In other chronic cases connected with debility, it has also been found particularly useful in moderate but continued doses; and if it shall prove to increase the solid constituents of the urine, and thus depurate the blood, its beneficial actions in these and other diseases can be more satisfactorily accounted for.

Quinine has often been beneficially used in *Hectic Fevers* from whatever local cause, and it possesses not a little power in controlling these symptoms. Twelve or fifteen grains given in the course of a day, will usually arrest the chills and check the other phenomena; but while the original cause remains, they are likely soon again to recur.

Quinine has an established reputation in various forms of *Neuralgia*. The impression which it is capable of producing on the nervous, and perhaps the secretory system also, is capable of relieving, in many cases of this distressing and yet "convenient" and fashionable disease, the painful symptoms. Except in cases where it is given in moderate and continued doses, with a reference to its alterative and tonic effects, it is only temporary in its action; and in the ordinary forms of this disease, nothing can serve as a substitute for proper hygienic management and the avoidance of the causes which so often in females, and those of the other sex of sedentary habits, produce it. Many neuralgias are distinctly intermitting in their attacks, and are in fact masked agues. In these cases, Quinine in anti-periodic doses is strongly indicated. Some cases of this kind are much more obstinate than common intermittents; and in

some few cases Arsenic seems to succeed even better than Quinine.

Quinine has been recommended, particularly in Paris, in *Acute Rheumatism*. It is given in large doses, and there is high authority in favor of its efficiency. I can not speak of it in this disease from my own experience, and will therefore refer you to the books for the evidences of its success.

Of the particular uses of this and the other preparations of Peruvian Bark as a simple tonic, I shall not speak here. The subject of Tonics will be discussed in a subsequent part of the Course, where this article will be briefly referred to again. I will simply say that it is applicable in small doses, in most cases where any of the vegetable bitters are required, besides having peculiar powers rendering it specially applicable as a tonic to a large range of diseases of debility.

There are various other special diseases to which Quinine by its peculiar qualities is applicable; to specify them all would detain us in this part of the Course too long; besides what has already been said, if duly comprehended, will lead to such a conception of its effects as will guide you in its application to other cases and conditions than those specially referred to. I shall now conclude the subject of Quinine, by describing somewhat more particularly the use of this article in several forms of malarial fever.

All of you who are residents of the West, and many of you who live east of the Alleghany Mountains and the Great Lakes, are familiar with the different modes of using Quinine in the *milder intermittents* commonly called "*Agues*."

When an attack of this disease occurs—the chill, the fever, and the sweat following each other in such rapid succession as to complete the paroxysm in a few hours, allowing the patient to arise from his bed, and perhaps to take his usual amount and quality of food; if the secretions be not much affected, the tongue remaining tolerably clean; if the bowels are in a soluble and open state, and the head, as the fever goes off, is free from pain and heaviness,—from fifteen to twenty grains of Quinine

may be divided into four equal parts, and, without any preceding or other accompanying treatment, one of these doses may be given when the sweating has commenced, and the others repeated with sufficient frequency to have all taken some hours before the time of the next expected paroxysm. In many of the cases such as supposed, this may be all the treatment required. If, however, the appetite be depraved or gone, the tongue be much coated, the skin and eyes be at all icterode, or the head remain painful, confused, and heavy, other treatment will be needed. As a general rule, from eight to ten grains of Mass Hydrag., combined perhaps with an alkali, as a scruple or more of Bicarb. of Soda, should be given, and this followed in a few hours by a Seidlitz Powder or two, a bottle of Citrate of Magnesia, or by some other neutral salt, or a dose of Castor Oil, Rhubarb and Magnesia, or some other mild cathartic, will be proper to precede the use of the Quinine. After this has had its effect (in the mean time another paroxysm having, perhaps, occurred), the antiperiodic may be given in quantity and manner as advised before, and the treatment may thus be ended. If after this, however, the patient does not feel quite well, being confused, languid, and, as is commonly said, "bilious," another similar laxative may be needed, but whether this or not, a depurative agent, such as the Acetate of Potash, to act gently upon the secretions, especially the kidneys, increasing the elimination of nitrogenized matter, will be called for. *Tonics in such cases are not nearly as often required as these depurants and eliminatives.*

Not unfrequently in these cases there is a tendency to a re-appearance of the disease at a regular period observing the number seven, and most commonly in fourteen days. When this is manifestly the case, the attack may be anticipated by an antiperiodic dose of Quinine on the day preceding the expected attack. In all cases of this kind, the condition of the system should be observed in reference to the use of such eliminatives as have here been referred to. I am inclined to insist upon this, because I regard it as important. On this subject, the

late Dr. GOLDING BIRD has written with much force and clearness, and I commend to your attention his excellent work on Urinary Deposits, as containing an expression of his views on this subject which I endorse.

In intermittent fevers of a somewhat severer grade than those just mentioned, a very similar course of treatment should be pursued. In such cases, the preparatory and auxiliary treatment is still more important; and full twenty grains of Quinine during an intermission will be the more certainly effectual quantity. Here, as elsewhere, the rule of giving a full antiperiodic quantity during one intermission should be acted upon. Not unfrequently in these cases the Quinine may be prescribed at the first visit, combining it with Blue Mass or Hyd. cum Cretâ, and after the time for the next paroxysm has gone by without its occurrence, as will almost always have been the case if a scruple of Quinine has been given before the time of its usual appearance, a mild cathartic and the other proper depuratives may follow.

In *Autumnal Bilious Remittent Fevers*, which are but a higher grade of the same miasmatic or malarial disease, the treatment, though requiring some modifications, must be conducted on the same principles, as the disease is so similar. Here the intermissions are not distinct, at least for some time, and a variety of complications in the form of local irritations and derangements are apt to be present. These require some variety of treatment to meet each case; and as a very general rule, an impression should be made upon the secretions, the local symptoms should be somewhat abated in their force, and an approach to an intermission should be secured before the Quinine is used. Still an intermission of the fever is by no means essential, and after the administration of alteratives, evacuants, and eliminatives for one, two or three days, not neglecting the use of diaphoretics, the Quinine may be given at the period of the greatest remission, always here in decided doses, and usually combined with Morphine. These are the cases in which small, repeated, and protracted doses are particularly to be avoided. Be prompt and

decided in the use of the article, or wait for a more convenient season. In these cases, gastric irritation and tenderness is often present; and I can not omit to mention that when this is the case, a blister over the epigastrium is often very useful. It will generally allay that irritation in a very decided manner, and by so doing will often effect an intermission of the fever, and cause the Quinine to be better borne.

But the cases to which I wish more particularly to call your attention, are those called *Malignant Congestive*, or *Pernicious Miasmatic Fevers*.

Dr. J. H. BAILEY of the United States Army, whose field of observation in miasmatic diseases has been chiefly in the southwestern portion of our country, describes (in a communication to the Surgeon-General, and recently published in an Appendix to the exceedingly interesting and valuable Statistical Report of the Sickness and Mortality in the Army of the United States, prepared under the direction of Surgeon-General LAWSON by R. H. COOLIDGE, M. D., Assistant Surgeon, and issued as a public document of the United States Senate) two forms of what is called "Congestive Fever," differing in character, and often in the treatment required; and many years since, when miasmatic fevers were so much more prevalent and intense in the North-West than at present, I had recognized the same varieties here.

In the first, the fever comes on in the usual manner of a severer grade of autumnal malarial fever, and is distinctly intermitting in its character,—one, two, or three paroxysms often presenting nothing very unusual, though a close observer may have noticed that during the paroxysm, and perhaps after, the patient was a little more stupid or confused than usual. At length, and sometimes from the first, the cold stage is protracted—the re-action does not normally occur. The skin may become moist; the countenance livid and sunken; the respiration laborious; the pulse becoming feeble, or ceasing at the wrist; the voice husky, or rather faint and whining; the vital powers sink rapidly; and if no efficient means are used to arrest the course of events, the patient passes into a fatal lethargy.

This is a condition of *collapse*, and may occur in what are called "Bilious Fevers" of a miasmatic origin, on the third, fourth, or fifth day. These phenomena seem to be the direct result of the miasmatic or malarial poison; and Quinine is the *antidote*. It should be administered at once and *freely*. If given while any considerable vitality is left, it seldom fails of success. While sensation is left, if there be no serious local lesion, it will save life, especially if in the lowest conditions it be combined with stimulants. Here it should be given largely. The intensity of the fever influence modifies the action of the Quinine, as severe pain and other nervous conditions do that of Opium; and doses of the antiperiodic that would be hardly safe in the physiological condition, are rendered beneficial and highly curative by the presence of so grave a disease. It may be given in doses of from half a scruple to half a drachm, and repeated several times if necessary. Much larger doses have, indeed, been given without apparent injurious consequences, and with the effect of promptly arresting the disease; but larger quantities than mentioned I think unnecessary, to say the least. All the good that can be realized from any doses, can be produced by such as have been named. It must be given without regard to periods, as no time is to be lost.

The other form of what is called "Congestive Fever," is where important organs—generally the brain or the stomach and liver, and sometimes the lungs—are seriously affected. The local lesion is congestion—sometimes active and sometimes passive in its character. I hope you have distinct ideas of what is meant by *congestion* of an organ. The term is sometimes used in a very vague sense. By congestion you understand a morbidly increased quantity of blood in a part. In active congestion the motion of the blood is increased in the part and generally in the whole system: in passive, the motion is diminished in the part, and often in the general system also; in either case, in the congestive fevers I am supposing, the functions of the organs affected are interfered with, and the nervous system suffers by consent, or sympathy, or shock. There may, in these cases, be

f.g. decided re-action—usually there is more or less; and if collapse occurs, as it so presently does, it is the result of the local lesion more than of the direct action of the poison, though the poison has caused the local lesion. This may be called "*Fever with Congestion*" or "*Local Congestive Fever.*" The other might be termed "*Collapsing Fever.*"

In the fever with local congestion, the lancet, cold affusions, cupping, counter-irritation, heat to extremities while cold may be applied to the head, and all other means for changing the determination of the blood and the development of nervous influence, may be brought into requisition, while at the same time antimitastics are used. These local congestions may come on very early, or at any subsequent period, in the course of a fever; and the stage at which they occur, the character and severity of the local lesion, the general condition of the system, the organs involved and the period of the difficulty in which you are called, will all modify the treatment required. With a knowledge of the pathological conditions, and of the full effects of the agents which may modify or remove them, you can not be at a loss how to act. You must not for a moment forget that a miasmatic influence is in full operation; that a malarial poison is the prime cause of all the difficulty; that as long as this is acting—that particularly at the recurrence of each paroxysm of fever—the local lesions will be almost necessarily increased; and that therefore a leading and most urgent indication is to neutralize this poison.

Still the other means for removing these local difficulties are often exceedingly important, and never should be overlooked. The great importance of heat and cold for these purposes, and the mode of applying them in arousing the system from this congestive stupor, you will recollect were pointed out when speaking of those agents. In general, the bowels should be evacuated by a brisk and speedy, though not too irritating, cathartic, Calomel usually being an ingredient, aided, perhaps, by enemata, or, if much depression on the stomach be involved, the latter alone may be used. If the head be the seat of active

exist

congestion, the cathartic will be better borne. The application of cold will be required while heat is applied to the extremities, with sinapisms and blisters to different portions of the surface—sometimes cups to the temples or nape of the neck, and possibly a venesection. And as soon as by these means and by the periodical abatement of the symptoms, some relief is obtained, the Quinine must be freely given, but its administration must not be too much protracted. Make the antiperiodic impression, and desist before irritation is produced.

If the congestion be of a more passive character, the Quinine may be given with more persistence, and perhaps with less care and reserve; yet in the more active cases, you must not forget the testimony in favor of its action as a sedative, and must not desist from its antiperiodic use, though an inflammation be present. In the passive cases, you must not neglect the other means referred to for impressing the nervous system, and changing the determination of blood.

In many cases of congestive fever, there is a combination of the two conditions described—that is, local congestions exist, while at the same time a direct and powerful depressing effect is exerted upon the system by the malarial poison, producing by both these means the state of collapse. In such cases, a judicious combination of the same means already referred to must be made; but high above all in importance and power—as the great agent without which nothing effectual can be done—stands the class of antiperiodics, with Quinine immeasurably superior to the rest.

I have not, Gentlemen, exaggerated the importance of Quinine in the treatment of these malignant, miasmatic, congestive fevers, in the slightest degree. The fatal termination of a large proportion of these cases, if left to themselves, or subjected to any other known mode of treatment, is almost as fixed and unerring as the decrees of fate. This has been proven over and over again. When once the congestive symptoms have made their appearance, marked by the coma and the indications of collapse, each succeeding paroxysm will produce an increase

of such symptoms, and the patient seldom survives the third or the fourth. The paroxysms must be arrested or the patient is lost; and Quinine with almost absolute certainty, if properly managed, will arrest the paroxysms. Though I have treated many cases, only in one instance has the remedy failed. In this I was called at the fifth or sixth paroxysm; and should I have a similar case again, I should try the effect of larger doses than I then gave, in combination with more active stimulants.

I can not close these Lectures on Quinine, without expressing the obligations which I believe the Profession should feel to the Medical Officers of the United States Army, if not for absolutely originating the practice of giving *Quinine in large doses* during the intermission and remission of miasmatic fevers, and for using it at all during the pyrexial periods of the same diseases, yet for "having demonstrated on an extensive scale its safety and efficacy" even when inflammation was present, "and of having thereby largely contributed to revolutionize the treatment of these fevers in this country."

As an offset to the many unpleasant circumstances connected with the "Florida War," a much more perfect knowledge of the powers and uses of Quinine was elicited from its painful experiences, and doubtless by that knowledge more lives have already been saved than were sacrificed in the sufferings of that campaign; thus affording one among the constantly-occurring illustrations of the fact, that the Disposer of events is,

"From seeming evil still educing good."

And the sad experiences of sickness, wherever there are careful and scientific Physicians, such as I hope you will be, to observe and reason, will tend to the continual improvement of the Profession of your choice, and in results to humanity which shall be

..... "better yet, and better still,
In infinite progression."

of such symptoms, and the patient seldom survives the third or the fourth. The prognosis must be arrested or the patient is lost; and Quinine with absolute certainty, if properly managed, will arrest the puerperium. Though I have treated many cases, only in one instance has the remedy failed. In this I was called at the fifth or sixth pregnancy; and should I have a similar case again, I should try the effect of larger doses than I then gave in combination with more active stimulants.

I can not close these lectures on Quinine without expressing the obligations which I believe the Profession should feel to the Medical Officers of the United States Army, if not for absolutely originating the practice of giving Quinine in large doses during the intermission and remission of malarial fevers, and for using it at all during the pyrexial periods of the same disease, yet for "having demonstrated on an extensive scale its early and efficacy" even when intermission was present; "and of having thereby largely contributed to revolutionize the treatment of these fevers in this country."

As an offset to the many unpleasant circumstances connected with the "Typhoid War," a touch of more perfect knowledge of the powers and uses of Quinine was elicited from its painful experience, and doubtless by that knowledge more lives have already been saved than were sacrificed in the suffering of that campaign; this illustrating one among the constantly occurring illustrations of the fact, that the triumph of science is

"From evening till all evening good."

And the real experience of medicine, wherever there is careful and scientific observation, such as I hope you will be, to observe and reason will tend to the continual improvement of the Profession of your choice, and in return to humanity which shall be

... "better yet, and better still."

In infinite progression."